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Air Vent

The present invention relates to an air vent to be mounted on a vehicle body, having a frame made of plastic and at least one electric or electronic component that is attached to the frame.

- 5 In air vents in the automotive sector, an antenna or a sensor may be mounted outside the vehicle onto the frame of the air vent to avoid radiation shielding by the car body. A connection cable for the antenna or sensor is passed through an opening in the frame and the opening is sealed. Subsequently, a connection plug is attached to the
- 10 cable.

- Conventionally, such an antenna (that may e.g. be used for emergency calls) is attached to the frame of the air vent by frame-integrated holding means (clips or tabs) or by separate clips. An assembly consisting of the air vent and the antenna with connection
- 15 cable and plug is then mounted onto the vehicle.

This known technology entails high costs because of complex tooling for fastening and tolerance compensation with aligning elements such as, for example, spring shackles, hooks, undercuts,

contact ribs or support ribs. Special tools are required for other fastening elements such as, for example, screws, rivets, clips, etc. The assembly costs are increased by the requirement of a tolerance compensation for the separate parts. Finally the electronic or electric
5 component is exposed to environmental influence and, in particular, to humidity.

According to the present invention, the air vent has a frame molded of a plastic material and the at least one electric or electronic component is embedded and over-molded in the plastic material. By
10 simply embedding in and over-molding the component with the frame, a number of advantages is achieved over the prior art. Among these are the following;

- assembly costs are reduced
- tolerance problems are avoided
- 15 the sealing on the vehicle body is improved
- the component is safely attached to the frame of the air vent
- the number of parts is reduced
- there is a quality improvement through reduction of the production steps or sources of error
- 20 fewer tools can be used
- the component is sealed in the plastic material and thus well protected from deterioration by environmental influence.

When the component is an antenna, the antenna body is embedded in the frame of the air vent by means of injection molding. As an alternative, a frame core is provided that has a recess for accommodation of the antenna. The frame core with the antenna body
5 are then taken to a mold and over-molded with plastic material, thereby incorporating the antenna in the frame of the air vent. Other components such as an antenna micro-strip, circuit parts and connectors may incorporated in the frame of the air vent simultaneously and in a similar manner.

10 A preferred embodiment of the invention will now be described with reference to the attached drawing wherein

Fig 1 is a perspective view of an air vent to be mounted on a vehicle body;

Fig. 2 is a cross-section along line II-II in Fig. 1; and

15 Fig. 3 a similar cross-section of an alternative embodiment.

The air vent has a generally rectangular frame 10 with two pairs of opposed frame sections. The longer ones 10a, 10b of opposed frame sections are spanned by a plurality of ribs 11. The frame with the ribs 11 is injection-molded from a plastic material. An antenna is
20 incorporated in the frame. Specifically, the antenna has a generally T-shaped metallic body 12 with a first branch 12a that spans the frame sections 10a, 10b centrally of the frame and a second branch 12b perpendicular to the first branch 12a and extending along frame section 12b.

In Fig. 1, the antenna body appears as raised above the outer surface of the vent frame and covered with plastic material. As seen in Fig. 2, the antenna body is in fact embedded in the body of the vent frame. This is achieved by placing the antenna body in a cavity of an injection mold and injecting the plastic material around the antenna
5 body.

In the alternative embodiment of Fig. 3, a frame core 10c has a locating recess for accommodation of the antenna body, the frame core 10c with the antenna body are taken to a mold cavity and both are
10 over-molded with plastic material, forming an outer layer 14 of the frame, whereby the antenna is incorporated in the frame of the air vent.